

# CLAIMS

I claim:

1. A composition comprising:

a) an electrode comprising:

- i) a monolayer comprising conductive oligomers; and
- ii) a capture probe;

b) a target sequence comprising a first portion that is capable of hybridizing to said capture probe, and a second portion that does not hybridize to said capture probe and comprises at least one covalently attached electron transfer moiety.

2. A composition comprising:

a) an electrode comprising:

- i) a monolayer comprising conductive oligomers; and
- ii) a capture probe;

b) a label probe comprising a first portion that is capable of hybridizing to a component of an assay complex, and a second portion comprising a recruitment linker that does not hybridize to a component of an assay complex and comprises at least one covalently attached electron transfer moiety.

3. A composition according to claim 2 wherein said ETM is ferrocene.

4. A composition according to claim 2 wherein said label probe comprises a plurality of ETMs.

5. A composition according to claim 2 wherein said first portion of said label probe further comprises a covalently attached ETM.

6. A composition according to claim 2 wherein said assay complex comprises an amplifier probe.

7. A composition according to claim 2 wherein said assay complex comprises a capture extender probe.

8. A composition according to claim 2 wherein said monolayer further comprises insulators.

9. A composition according to claim 2 wherein said capture probe is attached to said electrode via a conductive oligomer.

10. A composition according to claim 2 wherein said capture probe is attached to said electrode via an insulator.

11. A method of detecting a target nucleic acid sequence in a test sample comprising:

- a) attaching said target sequence to an electrode comprising a monolayer of conductive oligomers;
- b) directly or indirectly attaching at least one label probe to said target sequence to form an assay complex, wherein said label probe comprises a first portion capable of hybridizing to a component of said assay complex, and a second portion comprising a recruitment linker that does not hybridize to a component of said assay complex and comprises at least one covalently attached electron transfer moiety;
- c) detecting the presence of said ETM using said electrode.

12. A method according to claim 11 wherein said label probe comprises a plurality of ETMs.

13. A method according to claim 11 wherein said target sequence is attached to said electrode by hybridization to a capture probe.

14. A method according to claim 11 wherein said target sequence is attached to said electrode by hybridizing a first portion of said target sequence to a first capture extender probe, and hybridizing a second portion of said first capture extender probe to a capture probe on the electrode.

15. A method according to claim 11 wherein said target sequence is attached to said electrode by

- a) hybridizing a first portion of said target sequence to a first portion of a first capture extender probe;
- b) hybridizing a second portion of said first capture extender probe to a first portion of an capture probe on the electrode;
- c) hybridizing a second portion of said target sequence to a first portion of a second capture extender probe; and
- d) hybridizing a second portion of said second capture extender probe to a second portion of said capture probe.

16. A method according to claim 11 wherein said label probe is attached to said target sequence by hybridizing said first portion of said label probe to a first portion of said target sequence.

17. A method according to claim 11 wherein said label probe is attached to said target sequence by

- a) hybridizing a first portion of an amplifier probe to a first portion of said target sequence; and
- b) hybridizing at least one amplication sequence of said amplifier probe to said first portion of at least one label probe.

18. A method according to claim 11 wherein said label probe is attached to said target sequence by

- a) hybridizing a first portion of a first label extender probe to a first portion of a target sequence;

- b) hybridizing a second portion of said first label extender probe to a first portion of an amplifier probe;
- c) hybridizing at least one amplication sequence of said amplifier probe to said first portion of at least one label probe.

- 5 19. A method according to claim 11 wherein said label probe is attached to said target sequence by
- a) hybridizing a first portion of a first label extender probe to a first portion of a target sequence;
  - b) hybridizing a second portion of said first label extender probe to a first portion of an amplifier probe;
  - c) hybridizing a first portion of a second label extender probe to a second portion of a target sequence;
  - d) hybridizing a second portion of said second label extender probe to a first portion of an amplifier probe;
  - e) hybridizing at least one amplication sequence of said amplifier probe to said first portion of at least one label probe.
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